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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/881,460	06/14/2001	Douglas W. Couwenhoven	82887RLO	7546

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EXAMINER

MENBERU, BENIYAM

ART UNIT PAPER NUMBER

2626

DATE MAILED: 12/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/881,460	Applicant(s) COUWENHOVEN ET AL.	
	Examiner Beniyam Menberu	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 June 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6/14/01, 10/20/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

On page 1, lines 4-5 and page 8, line 10, the reference U.S. Patent Application Serial No. 09/213,637 is now a U.S. Patent No. 6407825.

On page 3, line 20, the term "resoLUTion" should be "resolution".

On page 7, line 19, there needs to be space between the terms "C,M,Y,Kcolor".

Appropriate correction is required.

Drawings

2. The drawings are objected to because in Figure 3 the input to reference 62 before the arrow is stated as "To box 10" when it should be "From box 10". Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s)

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should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. Claims 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5633662 to Allen et al in view of U.S. Patent No. 6327052 to Falk further in view of U.S. Patent No. 5857063 to Poe et al.

Regarding claim 1, Allen et al disclose a method for modifying an input digital image having an (x,y) array of pixels comprising:

determining a modified colorant amount for each color channel of the image pixel responsive to the input colorant amount for each color channel and a total colorant amount limit (column 4, lines 64-67; column 5, lines 1-2, lines 15-18, lines 25-32) and d) repeating steps for each pixel in the input digital image (column 5, lines 29-32). However Allen et al does not disclose a method of: determining an input colorant amount for each color channel of a pixel in response to the corresponding input code value and a colorant amount function that relates the input code value to the colorant amount for the corresponding color channel; wherein said input code value has a nonlinear relationship to colorant amount,

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determining an output code value for each color channel of the pixel responsive to the modified colorant amount and an inverse colorant amount function that relates colorant amount to the output code value for the corresponding color channel.

Falk discloses a method of determining an input colorant amount for each color channel of a pixel in response to the corresponding input code value and a colorant amount function that relates the input code value to the colorant amount for the corresponding color channel (column 3, lines 45-49). Further Falk discloses a method of determining an output code value for each color channel of the pixel responsive to the modified colorant amount and an inverse colorant amount function that relates colorant amount to the output code value for the corresponding color channel (column 3, lines 5-20).

Poe et al discloses a method wherein said input code value has a nonlinear relationship to colorant amount (column 8, lines 45-48, lines 65-67).

Allen et al, Falk, and Poe et al are combinable because they are in the similar problem area of color image data processing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the input color image data to colorant conversion and inverse conversion taught by Falk in addition to the nonlinear relationship taught by Poe et al into the system of Allen et al to implement an accurate colorant reduction method.

The motivation to combine the reference is clear because in order to implement the method of Allen et al the input data has to be converted to

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colorant amount space or volume and Falk teaches the colorant conversion.

Further inverse conversion as taught by Falk is necessary to convert the depleted colorant data back to image data space for further processing as required for printing. The nonlinear relationship as taught by Poe et al is needed to describe different behaviors of input devices to output devices.

Regarding claim 2, Allen et al in view of Falk further in view of Poe et al teach all the limitations of claim 1. Further Poe et al disclose a method of claim 1 wherein the input colorant amount is substantially linear with colorant volume (column 8, lines 55-60).

Regarding claim 3, Allen et al in view of Falk further in view of Poe et al teach all the limitations of claim 1. Further Poe et al disclose a method of claim 1 wherein the input colorant amount is a mass of colorant (column 2, lines 1-4).

Regarding claim 4, Allen et al in view of Falk further in view of Poe et al teach all the limitations of claim 1. Further Falk discloses a method of claim 1 further including providing a lookup table for each color channel wherein the colorant amount function is provided by the lookup table (column 9, lines 65-67; column 10, lines 1-3, lines 10-13).

Regarding claim 5, Allen et al in view of Falk further in view of Poe et al teach all the limitations of claim 1. Further Falk disclose a method of claim 1 wherein the colorant amount function and the inverse colorant amount function are substantially mathematically inverse operations from each other (column 9, lines 6-15).

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Regarding claim 6, Allen et al in view of Falk further in view of Poe et al teach all the limitations of claim 1. Further Allen et al disclose a method of claim 1 wherein step b) further includes the steps of:

- i) determining a total colorant amount for each pixel as the sum of the colorant amounts for each of the color channels (column 5, lines 55-58); and
- ii) determining the modified colorant amount for each color channel of the pixel responsive to the total colorant amount and the total colorant amount limit such that for such pixel the sum of the modified colorant amount for each color channels is less than the total colorant amount limit (column 5, lines 58-61; column 6, lines 4-8).

Regarding claim 7, Allen et al in view of Falk further in view of Poe et al teach all the limitations of claim 1. Further Allen disclose a method of claim 1 wherein the colorants are inks for use in an inkjet printer (column 4, lines 28-31).

Regarding claim 8, Allen et al in view of Falk further in view of Poe et al teach all the limitations of claim 7. Further Allen disclose a method of claim 7 wherein the colorant amounts correspond to ink volumes (column 5, lines 27-31).

Regarding claim 9, Allen et al in view of Falk further in view of Poe et al teach all the limitations of claim 1. Further Allen disclose a method of forming a color image in response to the modified digital image produced by claim 1 (column 5, lines 20-23).

Regarding claim 10, Allen et al in view of Falk further in view of Poe et al teach all the limitations of claim 1. Further Allen disclose a computer storage

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medium having instructions stored therein for causing a computer to perform the method of claim 1 (column 4, lines 3-4).

Other Prior Art Cited

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6331899 to Samadani disclose apparatus for single color channel transformation.

U.S. Patent No. 6088122 to Coleman disclose a method for colorant controlled printing.

U.S. Patent No.5832109 to Mahy disclose apparatus for color gamut determination.

U.S. Patent No. 6084689 to Mo disclose method for compensation of colorant with ink limitation.

U.S. Patent Application Publication No. US 2004/0109180 A1 to Braun et al disclose a method for reduction of color gamut.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Beniyam Menberu whose telephone number is (703) 306-3441. The examiner can normally be reached on 8:00AM-4:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Williams can be reached on (703) 305-4863. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the customer service office whose telephone number is (703) 306-5631. The group receptionist number for TC 2600 is (703) 305-4700.

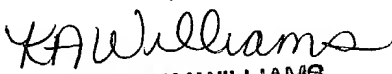
Patent Examiner

Beniyam Menberu

BM

11/22/2004

A circular stamp with the text "KIMBERLY WILLIAMS" at the top and "SUPERVISORY PATENT EXAMINER" at the bottom. The stamp is partially obscured by a signature.


KIMBERLY WILLIAMS
SUPERVISORY PATENT EXAMINER